



WILLOW CREEK RESTORATION
SILVER GATE, MT

PREPARED FOR:



**Montana Fish,
Wildlife & Parks**

600 NORTH PARK AVE.
HELENA, MT 59601

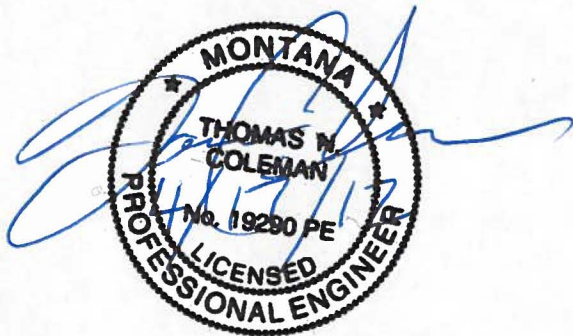
PREPARED BY:

oasis | ENVIRONMENTAL

PO BOX 582
LIVINGSTON, MT 59047

SHEET INDEX

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DRAWN: TC
PROJ. No.: 281-021
PO Box 582 Livingston, MT 59047 (406) 222 7600

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1	MWFP REVISIONS	TNC	4/17/12

WILLOW CREEK RESTORATION
COVER SHEET AND VICINITY MAP

SILVERGATE, MONTANA

SHEET
C1

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GENERAL SPECIFICATIONS

THE PROJECT SHALL BE CONSTRUCTED ACCORDING TO THESE CONSTRUCTION SPECIFICATIONS, THE PLAN SET, AND SPECIAL CONDITIONS OUTLINED IN PROJECT PERMITS. THE CONTRACTOR SHALL NOTIFY THE PROJECT MANAGER OF ANY CONFLICTS PRIOR TO IMPLEMENTATION. THE PROJECT MANAGER WILL BE OASIS ENVIRONMENTAL, INC.

IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO CONSTRUCT THE PROJECT TO SPECIFICATIONS. WORK SHALL CONSIST OF FURNISHING ALL EQUIPMENT, MATERIALS, LABOR AND PERFORMING ALL OPERATIONS IN CONNECTION WITH THE CULVERT REPLACEMENTS AND CHANNEL ALTERATIONS AS SHOWN ON THE DRAWINGS OR AS SPECIFIED HERE.

ALL WORK SHALL BE IN ACCORDANCE WITH SAFETY REQUIREMENTS OF OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), SAFETY AND HEALTH REGULATIONS, PART 1926, SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION, SUBPART P, EXCAVATIONS.

WORK SHALL COMPLY WITH STANDARDS OUTLINED IN THE CURRENT VERSION OF THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS)

IT IS THE CONTRACTORS RESPONSIBILITY TO IDENTIFY ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION.

EQUIPMENT SPECIFICATIONS

THE CONTRACTOR SHALL FURNISH ALL EQUIPMENT NECESSARY TO CONSTRUCT THE PROJECT. THIS WORK WILL OCCUR IN A RESIDENTIAL SETTING. WITH THE EXCEPTION OF CROSSINGS WHERE MACHINERY CAN BE OPERATED FROM ROAD SURFACES, EQUIPMENT USE SHALL BE LIMITED TO RUBBER TRACKED MACHINERY NO GREATER THAN 3.5 TON OPERATING WEIGHT.

ALL RUTS AND VEGETATION DISTURBANCE DUE TO MACHINE OPERATION SHALL BE RECLAIMED BY THE CONTRACTOR. ALL GRADES WILL BE RESTORED TO PRE-DISTURBANCE LEVELS AND SEEDED WITH AN APPROPRIATE SEED MIX.

ALL EQUIPMENT SHALL BE POWER WASHED PRIOR TO MOBILIZATION TO THE SITE TO MINIMIZE THE POTENTIAL FOR INTRODUCTION OF NOXIOUS PLANTS AND AQUATIC INVASIVES. EQUIPMENT SHALL BE FREE OF OIL, HYDRAULIC FLUID, AND DIESEL FUEL LEAKS.

EQUIPMENT SHALL BE WELL MAINTAINED TO REDUCE THE RISK OF FLUID LEAKS DURING CONSTRUCTION. THE CONTRACTOR SHALL HAVE FLUID SPILL CONTAINMENT EQUIPMENT PRESENT AT THE JOB SITE AT ALL TIMES. IF A SPILL OCCURS CONTRACTOR SHALL IMMEDIATELY NOTIFY THE

PROJECT MANAGER.

COSTS INCURRED AS A RESULT OF EQUIPMENT BREAKDOWN SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

MATERIAL SPECIFICATIONS

THE CONTRACTOR SHALL FURNISH ALL MATERIALS NECESSARY TO CONSTRUCT THE PROJECT AND TRANSPORT THEM TO THE PROJECT SITE. CONSTRUCTION MATERIALS SHALL CONFORM TO THE REQUIREMENTS SHOWN ON THE DRAWINGS OR AS SPECIFIED HERE.

CONTRACTOR IS RESPONSIBLE FOR HIRING AND PAYING FOR AN INDEPENDENT TESTING AGENCY FOR ALL MATERIAL TESTING AND CONFORMANCE. TESTING SHALL CONFORM TO THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS).

CONTRACTOR SHALL ADHERE TO ALL PARK SERVICE RESTRICTIONS AND REQUIREMENTS FOR TRANSPORTING MATERIAL AND EQUIPMENT THROUGH YELLOWSTONE NATIONAL PARK.

BIOLOGS SHALL BE COIR WITH A 12 INCH DIAMETER AND CLASSIFIED AS A NORMAL DENSITY (7 LBS/FT^3).

SPAWNING GRAVELS SHALL CONFORM TO THE GRADATION SHOWN ON SHEET C3. A BAG SAMPLE AND GRADATION OF THE SPAWNING GRAVEL SHALL BE SUBMITTED TO MONTANA FISH WILDLIFE AND PARKS FOR INSPECTION PRIOR TO TRANSPORTING THE MATERIAL TO THE SITE.

STAKES FOR SECURING BIOLOGS SHALL BE DIAGONAL CUT 2 x 4'S WITH A MINIMUM LENGTH OF 18 INCHES.

CRUSHED ROAD MIX SHALL BE 1.5" MINUS, WELL GRADED CRUSHED ROCK CONTAINING NO CLAY OR SILT.

CULVERT BEDDING MAY BE MPWSS TYPE I BEDDING. EXISTING MATERIALS MAY BE USED FOR BEDDING IF INSPECTED AND APPROVED BY AN ENGINEER.

CONSTRUCTION SPECIFICATIONS:

CONSTRUCTION SHALL BE COMPLETED IN JUNE FOLLOWING SNOW MELT ALONG WILLOW CREEK BUT PRIOR TO CUTTHROAT TROUT SPAWNING. CONTRACTOR SHALL MAKE ALL REASONABLE EFFORTS TO LIMIT TURBIDITY DURING CONSTRUCTION AND CONTRACTOR SHALL COMPLY WITH PROJECT PERMITS.

THE PROJECT MANAGER WILL STAKE THE PROJECT PRIOR TO CONSTRUCTION TO DEFINE TREATMENT START AND END POINTS.

BIOLOGS SHALL BE PLACED AND STAKED BY HAND TO NARROW SECTIONS OF THE CREEK AS DEFINED BY THE LAYOUT SURVEY. STAKES SHALL BE PLACED AT 2 FOOT INTERVALS ON ALTERNATING SIDES OF THE BIOLOGS. WHERE GOOD QUALITY WETLAND SOD (MINIMUM OF 12 INCHES IN THICKNESS) OR NATURAL LOGS ARE AVAILABLE THEY MAY BE SUBSTITUTED FOR BIOLOGS WITH THE APPROVAL OF THE PROJECT MANAGER.

PLACEMENT OF BIOLOGS WILL NARROW THE ACTIVE CHANNEL AND ISOLATE PORTIONS OF THE CHANNEL THAT SHALL BE BACKFILLED. BACKFILL SHALL BE BROUGHT TO A LEVEL EQUAL TO THE TOP OF THE ASSOCIATED BIOLOG. BACKFILL MATERIAL MAY BE OBTAINED BY EXCAVATING POOLS OR SPAWNING AREAS AS DEFINED BY THE PROJECT STAKING OR WHERE EXISTING BANKS ARE GREATER THAN 1 FOOT IN HEIGHT (MEASURED FROM THE STREAMBED), THESE BANKS MAY BE SLOPED AND EXCESS MATERIAL USED IN THE BACKFILL ZONES.

SPAWNING AREAS SHALL BE CREATED BY EXCAVATING THE STREAMBED, AS STAKED, TO A MINIMUM DEPTH OF 0.5 FEET WITH A DEPTH OF 1.0 FOOT BEING ACHIEVED OVER 50% OF THE EXCAVATIONS. EXCAVATIONS WILL AVERAGE 2 TO 3 FEET IN WIDTH BY 5 TO 10 FEET IN LENGTH.

DISTURBED SLOPES CORRESPONDING TO CULVERT BACKFILLS AND MATERIAL BORROW AREAS SHALL BE SEEDED AND EROSION CONTROL FABRIC INSTALLED. EROSION CONTROL FABRIC SHALL BE NORTH AMERICAN GREEN C125 BN OR AN EQUIVALENT PRODUCT AND IT SHALL BE STAKED PER MANUFACTURERS RECOMMENDATIONS. THE FABRIC SHALL BE 100% BIODEGRADABLE.

FLAT LANDSCAPING ROCK LINING THE CHANNEL EDGES BETWEEN STATIONS 5+00 TO 6+00 SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.

LARGE IN CHANNEL ROCK BETWEEN STATIONS 7+00 TO 8+00 SHALL BE REMOVED, SALVAGE AND STORED ON SITE BY THE CONTRACTOR.

SPECIAL CONDITIONS:

STAGING AND MATERIAL STOCKPILE LOCATIONS WILL BE DETERMINED AND COMMUNICATED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.

EXCESS EXCAVATION SHALL BE HAULED OFF SITE BY THE CONTRACTOR. MATERIALS ARE EXPECTED TO BALANCE FAIRLY CLOSELY BUT CONTRACTOR SHOULD ASSUME 10 TO 20 YD^3 OF DISPOSAL FOR BIDDING PURPOSED.



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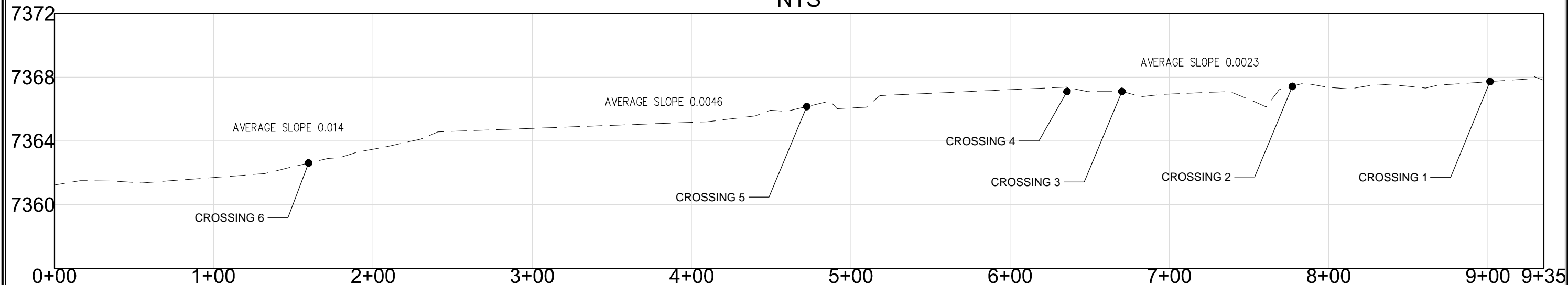
WILLOW CREEK RESTORATION
CONSTRUCTION SPECIFICATIONS

SILVERGATE, MONTANA

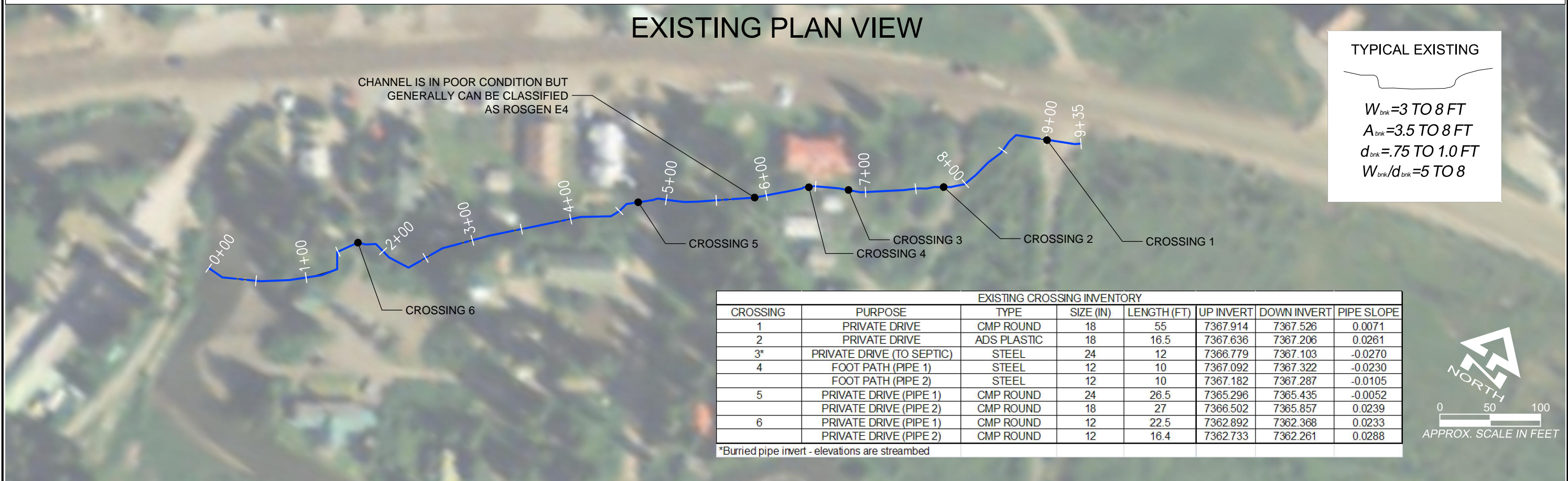
SHEET
C2


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EXISTING CENTERLINE PROFILE NTS



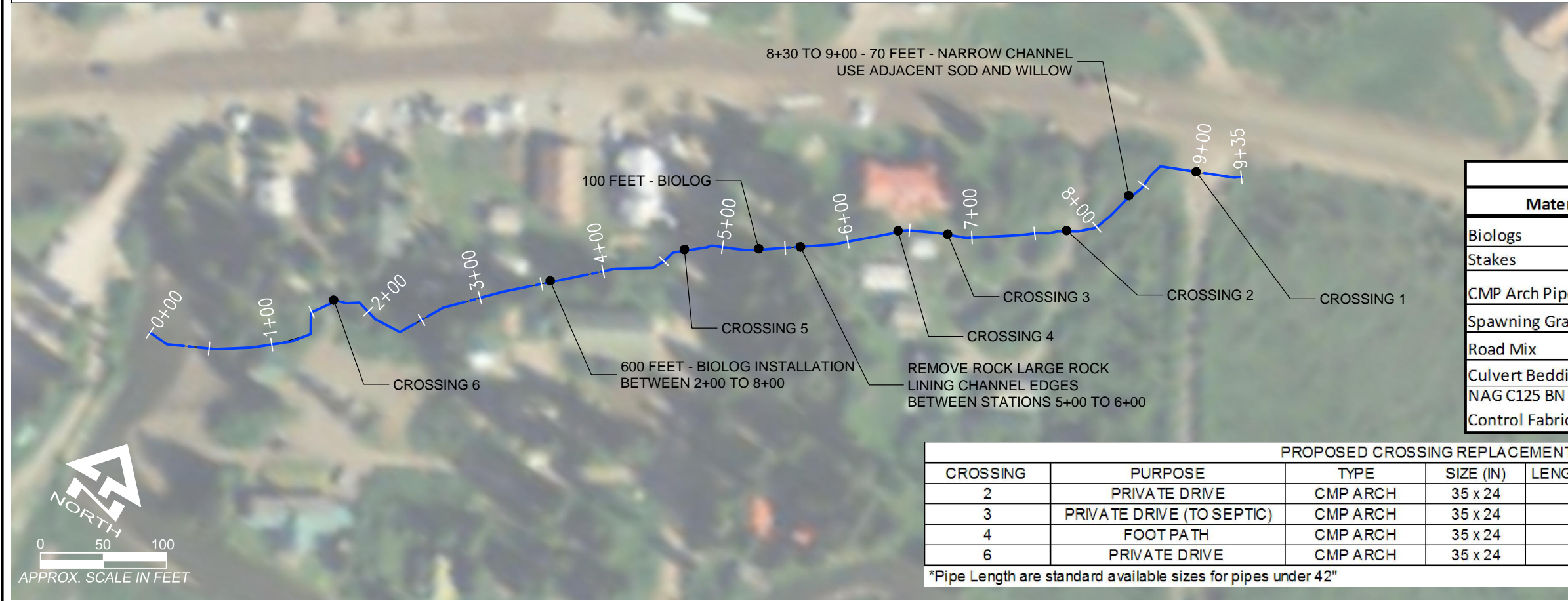
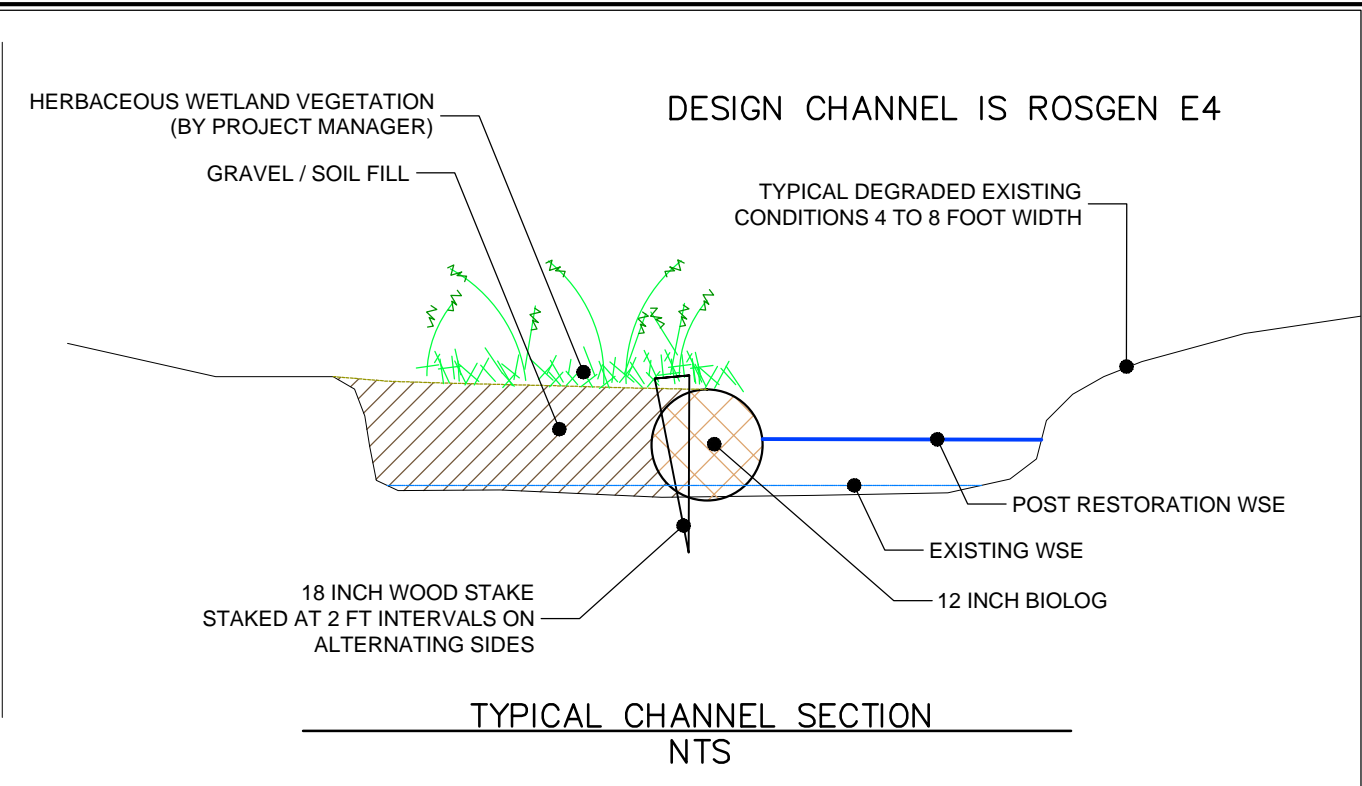
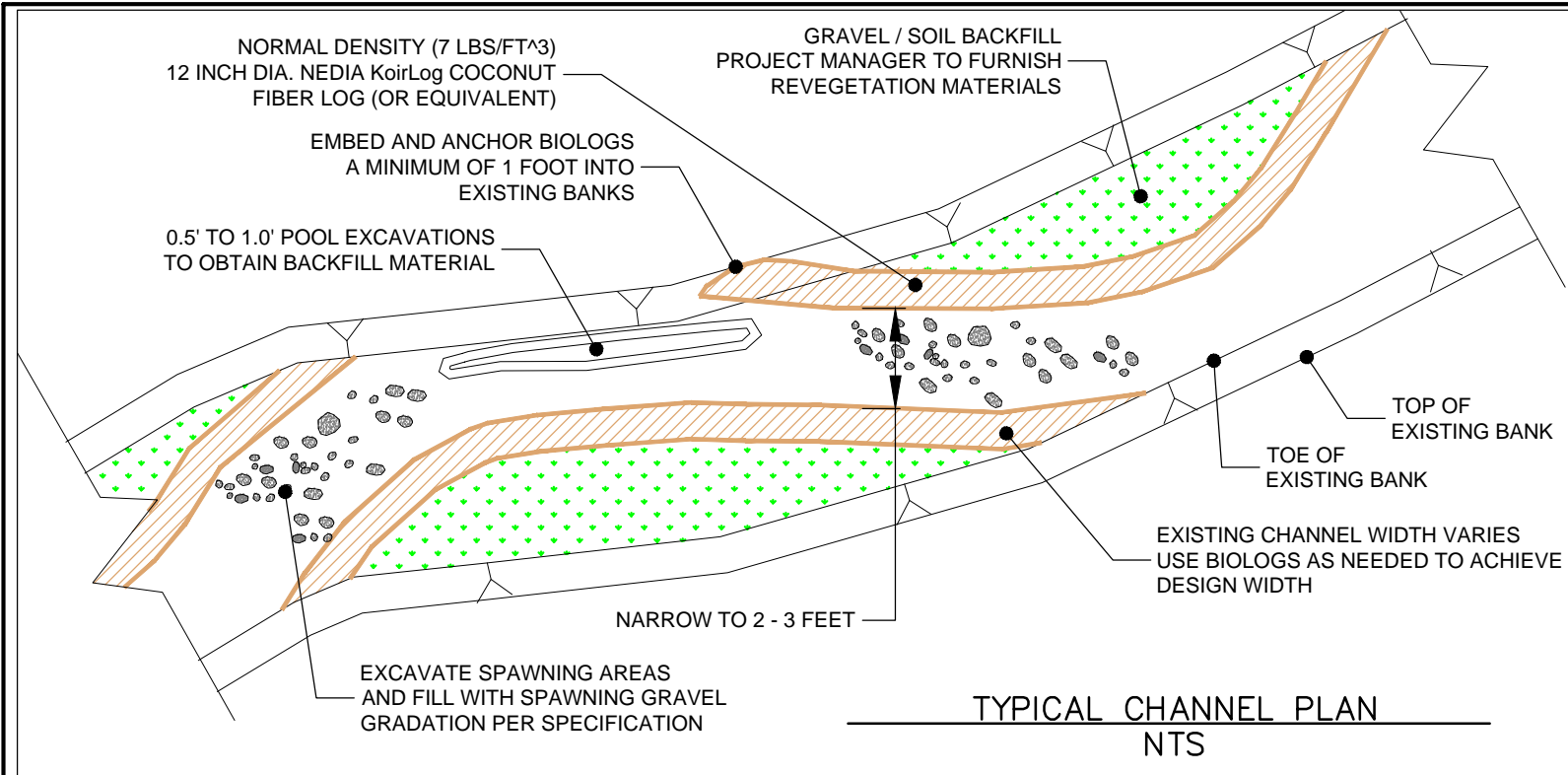
EXISTING PLAN VIEW



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Spawning Gravel - Particle Size Distribution	
Dia (in)	Percentage of Mix
0.5 - 1.0	35%
1.0 - 2.0	35%
2.0 - 3.0	20%
3.0 - 6.0	10%

Project Materials and Quantities		
Material	Size	Quantity
Biologs	12 in Dia	600 ft
Stakes	18 inch	300
CMP Arch Pipe	35" X 24"	70 ft
Spawning Gravel	See Gradation	30 yd ³
Road Mix	See Specification	10 yd ³
Culvert Bedding	See Specification	7 yd ³
NAG C125 BN Erosion Control Fabric	6.7' X 108'	1 Roll

PROPOSED CROSSING REPLACEMENTS							
CROSSING	PURPOSE	TYPE	SIZE (IN)	LENGTH (FT)*	UP INVERT	DOWN INVERT	PIPE SLOPE
2	PRIVATE DRIVE	CMP ARCH	35 x 24	20	7367.5	7367.2	0.0150
3	PRIVATE DRIVE (TO SEPTIC)	CMP ARCH	35 x 24	16	7367.0	7366.7	0.0188
4	FOOT PATH	CMP ARCH	35 x 24	10	7366.5	7366.3	0.0200
6	PRIVATE DRIVE	CMP ARCH	35 x 24	24	7362.9	7362.4	0.0208

*Pipe Length are standard available sizes for pipes under 42"

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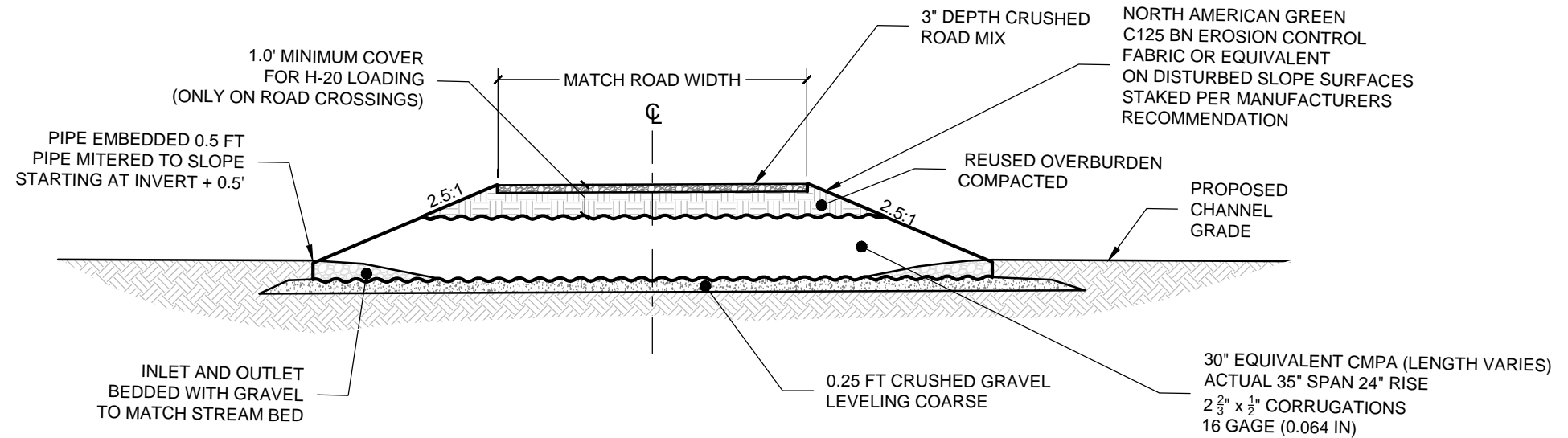
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PROPOSED SITE CONDITIONS

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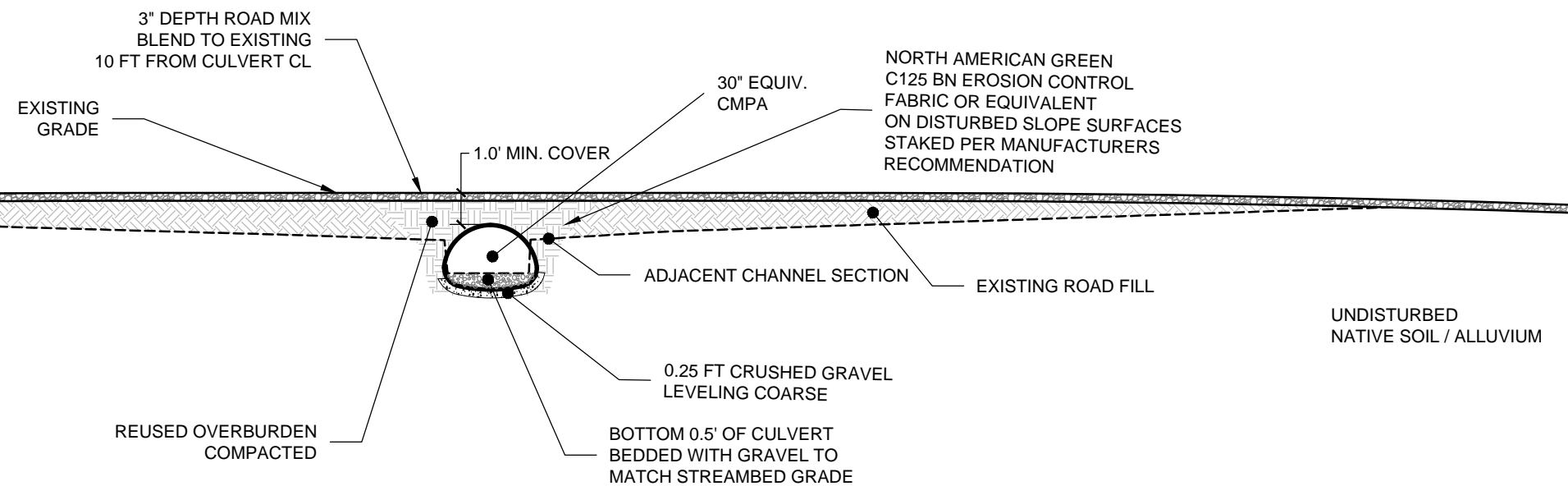
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TYPICAL CULVERT PROFILE

NOTES:

- 1) THE LEVELING COURSE SHOULD CREATE A UNIFORM LEVEL SURFACE TO SUPPORT THE PIPE AND TO HELP SEAT THE CORRUGATIONS.
- 2) FROZEN SOIL, SOD, AND LARGE ROCKS SHOULD BE REMOVED FROM THE BED
- 3) EXCAVATED OVERBURDEN MAY BE REUSED TO BACKFILL NEW PIPE INSTALLATIONS. BACKFILL SHOULD BE FREE OF LARGE ROCKS, FROZEN SOIL AND OTHER DEBRIS.
- 4) BACKFILL SHOULD BE PLACED IN 6" LIFTS DEPOSITED ALTERNATELY ON OPPOSITE SIDES OF THE PIPE. EACH LAYER SHOULD BE COMPACTED CAREFULLY TO AVOID DAMAGING THE PIPE.



TYPICAL CULVERT CROSS SECTION

0 5
APPROX. SCALE IN FEET



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